COMP SAVE

INSTRUCTION MANUAL

REGATRON

POWER SUPPLY

MODEL 236AmK

SERIAL No. _____

ELECTRONIC MEASUREMENTS

A Division of THE ROWAN CONTROLLER COMPANY

EATONTOWN • NEW JERSEY

TELEPHONE: (201) 542-0300 TWX: (201) 542-2273 CABLE: ELMEASCO

Warranty

Electronic Measurements instruments are guaranteed to be free from defects in material and workmanship for one year from the date of purchase (except for tubes, fuses and batteries). Our liability under this warranty is limited to repairs and adjustments or replacements of defective parts or instruments when the fault is a direct result of defective materials or workmanship in the manufacture of the apparatus. This warranty covers service for the first year, except for transportation to and from the factory. If any fault develops in the equipment, the following steps should be taken:

1. Notify ELECTRONIC MEASUREMENTS. Give full particulars of the difficulty and include the serial number of instrument in question. On receipt of this information, we will give you service information or shipping instructions.

2. On receipt of shipping instructions, forward the appartus to us, prepaid, and we will make repairs and adjustments immediately at the factory.

3. If the fault has been caused by misuse, or abnormal conditions of operation, as disclosed by our examination, repairs will be billed at cost. In this case, an estimate of the cost will be submitted before work is started.

ELECTRICAL STANDARDS

All company primary standards are either certified directly or are traceable to certification by the National Bureau of Standards.

CLAIM FOR DAMAGE IN SHIPMENT

This instrument received comprehensive visual and electrical inspections before shipment. Immediately upon receipt from the carrier, and before operation, this instrument should be inspected visually for damage caused in shipment. If such inspection reveals internal or external damage in any way, a claim should be filed with the carrier. A full report of the damage should be obtained by the claim agent and this report should be forwarded to us. We will then advise you of the disposition to be made of the equipment and arrange for repair or replacement. When referring to this instrument, always include the model and serial numbers.

MP MASTER
MA29687

REGATRON

PROGRAMMABLE

POWER SUPPLY

MODEL - 235 & 236 AMK

Serial No._____

Issued: March 1961

E/M*REGATRON POWER SUPPLY
TABLE OF SPECIFICATIONS

MODEL	DC OUTPUT VOLTS CURRENT	INPUT POWER REQUIRED IN WATTS	DIMENSIONS IN INCHES			APPROX. WEIGHT IN LBS.
			PANEL HEIGHT	PANEL WIDTH	DEPTH BEHIND PANEL	
235A	0-600 0-500ma	802	10-1/2	19	16-3/4	78
236A	0-600 0-200ma 0-150 0-5ma 6.3VAC 10 AMP	450	8-3/4	19	15	52

REGULATION
LINE: 0.05% or 0.05 volts, whichever is greater, for line change from 105 to 125 volts ac, 50-60 cps.

LOAD: 0.025% or 0.03 volts, whichever is greater, from no load to full load.

REGULATION WITH CHOPPER STABILIZATION
LINE OR LOAD: 0.01% or 3 millivolts, whichever is greater.

REGULATION OF 0 TO 150 VOLT DC OUTPUT: 0.5% at maximum setting.

STABILITY: Within 0.1% or 50 millivolts, whichever is greater, for 8 hours after 30-minute warmup under fixed line, load, and temperature conditions, and using precision high-stability external programming resistor.

STABILITY WITH CHOPPER STABILIZATION: 0.05% + 2 millivolts, same conditions as above.

RIPPLE: 1 millivolt RMS maximum with positive or negative output grounded.

OUTPUT IMPEDANCE: Less than 0.01 ohm at low audio frequencies; 0.1 ohm to 10 KC; 1 ohm from 1 to 40 KC.

TRANSIENT RESPONSE: For step change from no load to full or full to no load, output recovers to within dc regulation limits of initial value within 0.5 millisecond.

PROGRAMMING CONSTANT: 500 ohms-per-volt of output.

REMOTE SENSING: Panel terminals permit sensing of positive and negative output leads.

AMBIENT TEMPERATURE RANGE: -20°C to +45°C.

OUTPUT GROUND: Positive, negative or floating output.

CIRCUIT PROTECTION: Input ac line fused, main dc output fused.

TERMINATIONS: Front: 5-way insulated binding posts. Rear: barrier-type terminal strips. Line cord is 3-conductor type.

CONTROLS: Output voltage controls are wirewound. Panel calibration is approximate.

MOUNTING: Unit fits 19" standard racks and is equipped with rubber feet for table mounting. Top and bottom are protected by perforated metal covers.

FINISH: Smooth gray semi-gloss enamel Class 2 per MIL-E-15090.

*Registered U.S. Patent Office. Patents issued and pending.

ELECTRONIC
MEASUREMENTS
A Division of THE ROWAN CONTROLLER COMPANY
LEWIS STREET and MAPLE AVENUE · EATONTOWN · NEW JERSEY

INSTRUCTION SHEET 103
20 Feb. 1963

Reprinted: March 10th 66

INSTRUCTIONS FOR USE OF REGATRON ® POWER SUPPLIES MODIFIED FOR MHOGRAMMED (™) OPERATION

This power supply has been modified so that it can be Mhogrammed, or remotely controlled by conductance programming, with resistor R_m connected externally as shown in figure 1 or 2. Output voltage is then inversely proportional to the resistance of R_m and varies proportionally with conductance.

The Mhogramming constant for this power supply is 0.2 micromhos per 1% of maximum output voltage. Therefore, 100% of maximum voltage requires 20 micromhos, and conductances can readily be calculated for other percentages of maximum voltage.

The conductance required for any given voltage is $g_2 = \frac{Pgk}{100}$

where P = percentage of full voltage desired, and gk = mhogramming constant, as described above.

With conductance expressed in micromhos, the resistance of R_m is readily calculated from

$$R_m = \frac{10^6}{g_2}$$

Since voltage varies directly with conductance, the value of R_m signifies the fraction or percentage of the maximum voltage of the power supply which is actually developed*, rather than a numerical value. Thus, if 20 micromhos (an R_m of 50,000 ohms) develops maximum output voltage, a conductance of 10 micromhos develops one-half the maximum voltage of the supply. A conductance of 2 micromhos develops 10% of maximum voltage, and 0.2 micromhos (R_m of 5 megohms) develops 1% of maximum voltage.

For the basic form of Mhogrammed operation, proceed as follows:

a. Turn the power supply off. Set the panel controls for zero output voltage.

b. Make the connections shown in figure 1 for local sensing, or as shown in figure 2 for remote sensing with regulation directly at the load. A precision 50,000-ohm resistor should be used for R_m.

*Among units of different voltage ratings.
® Registered U.S. Patent Office. Patents issued and pending.

c. Turn the power supply on and adjust the DC CONTROL and VERNIER to obtain an output voltage of exactly the maximum rated voltage. The DC CONTROL and VERNIER should be left at this setting or a fixed resistor and trimmer resistor may be substituted for greater mechanical stability. Where substitution is made, the resistor used should be of a highly stable wire-wound type.

d. The power supply is now calibrated for the correct Mhogramming constant. The output voltage is now determined by the value of Mhogramming resistor R_m according to the Mhogramming constant.

Caution: The Mhogramming lines should not be allowed to short.

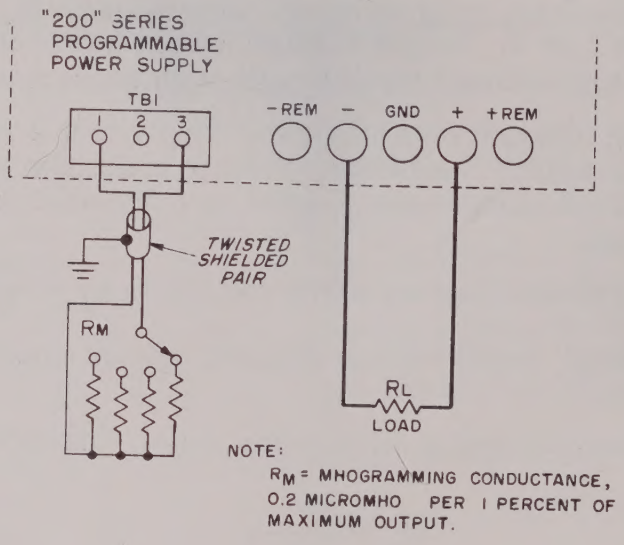


Figure 1. Mhogramming, local sensing.

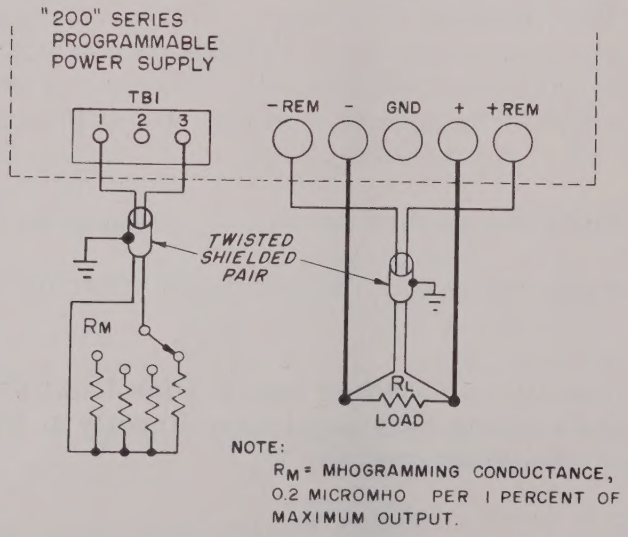


Figure 2. Mhogramming, remote sensing.

I. GENERAL

1. DESCRIPTION

The Programmable REGATRON is a new type of power supply designed to meet the need for remote control arising out of the increasing tendency towards automation, centralized control, etc. The word, "programmable" has been coined to indicate the fact that the unit may be controlled or "programmed" from a remote or central point. In the design this has been made possible by very simple means, so that the proper control or programming function can be readily incorporated in automatic switching devices.

The circuitry developed for this application embodies a null-balance arrangement which provides unprecendented performance and stability at relatively low cost. Many novel features enhance the usefulness of this unit for general purpose applications.

2. INSPECTION

After unpackaging the unit, inspect the tubes to see that they are securely in their sockets. Enclosed units may be inspected internally by removing the cover screws and sliding the cover backwards.

II. INSTALLATION

1. POWER

This unit requires a source of 105 to 125 volts ac at 50 to 60 cps.

2. PLACEMENT

Cabinet units may be placed on a flat surface on the rubber feet provided. Rack units may be located in the same fashion or attached to a rack panel having standard rack drilling. When placing the unit in position, ventilation openings should be left clear. If mounted in a rack, this consideration should be kept in mind.

III. OPERATION

WARNING

Lethal voltages appear at the output terminals and at various points within the unit. In operation, great care should be observed to avoid accidental contact with any exposed load connections or leads. Load connections should be made with the power off.

1. PRELIMINARY

General Purpose Use: This unit may be used as a general purpose power supply. To so employ it, proceed as follows:

a. Place the switches and controls in the following positions:
   (1) Line and high voltage switches - off (down).
   (2) H.V. control and vernier - Minimum (counter-clockwise).
   (3) Bias control - Minimum (ccunterclockwise).
   (4) Local remote switch - Local

b. Make load connections to the binding posts at the front of the unit. The grounded post should securely compress the connecting device or lead as well as the grounding link.

c. Plug the line cord into an outlet providing 115 volts ac at 50 to 60 cps. Operate the line switch to the "on" position (green indicator will glow).

d. Wait one minute and apply voltage to the load by operating the high voltage switch to the on position (up). This will be indicated by the red indicator light.

2. ADJUSTMENT OF VOLTAGES

All the panel controls are approximately calibrated, hence voltages can be set approximately without the use of meters.

a. Bias: The bias is adjustable from 0 to -150 using the approximate panel calibration. The positive terminal of this output is permanently connected to the negative terminal of the high voltage.
   Note: Bias is not turned off by the H.V. switch.

b. High Voltage and Vernier Controls: These controls may be set in the obvious manner except that the output voltage will be the sum of both readings; thus the vernier will add from 0 to 30 volts at any point in the range. If a high order of stability is required for voltages below 30 volts, the main control may be left at zero and the vernier used alone.

3. REVERSAL OF POLARITY

This power unit has been designed so that either side of the high voltage may be grounded to the case as desired. The unit is normally supplied with the negative side grounded. To reverse polarity, loosen the three (3) high voltage binding posts, swing the link to the other post, and retighten the two (2) posts on the link. The load connection for the ground side may be inserted either under the ground post or the grounded terminal.
Note: For local use the black REM post may be used as an additional negative terminal and the red REM post may be used as an additional positive terminal.

4. REMOTE CONTROL USE:

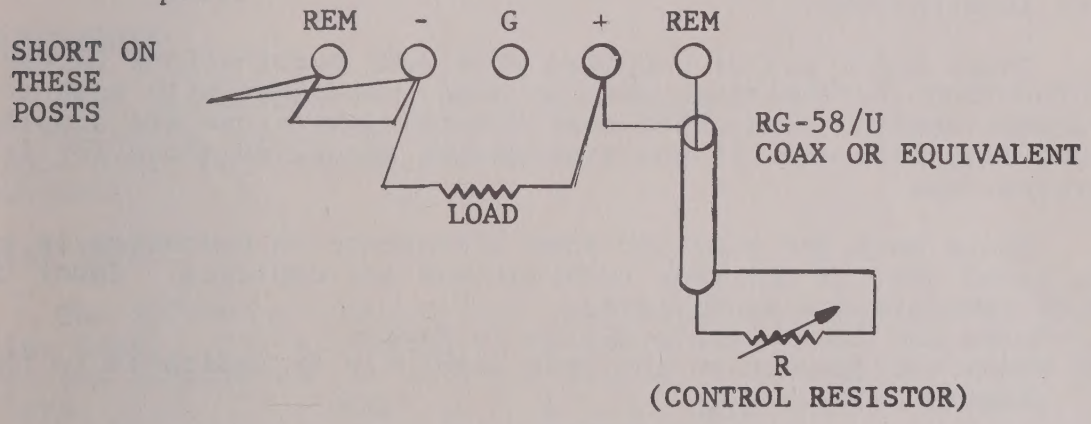
Note: Production units are normally calibrated to make panel calibrations approximately correct. Thus, depending on the tolerance of the internal potentiometer, the calibration may be somewhat more or less than 500 ohms-per-volt. Accordingly, if precisely 500-ohms-per-volt is desired for remote use, one of the following will be necessary:
(a) Call for 500-ohms-per-volt calibration when ordering.
(b) Recalibrate in the field (see below).

Two modes of operation are possible in operating this unit by remote control. They will be described in order of the most probable useage below.

MODE 1:

This method provides remote control without load sensing; therefore, the length of leads between the terminal posts and the load will influence the amount of voltage drop.

a. Throw the local remote switch to REM and make connections as indicated below. Make certain that the outer sheath of the coax line is connected to the plus output post.

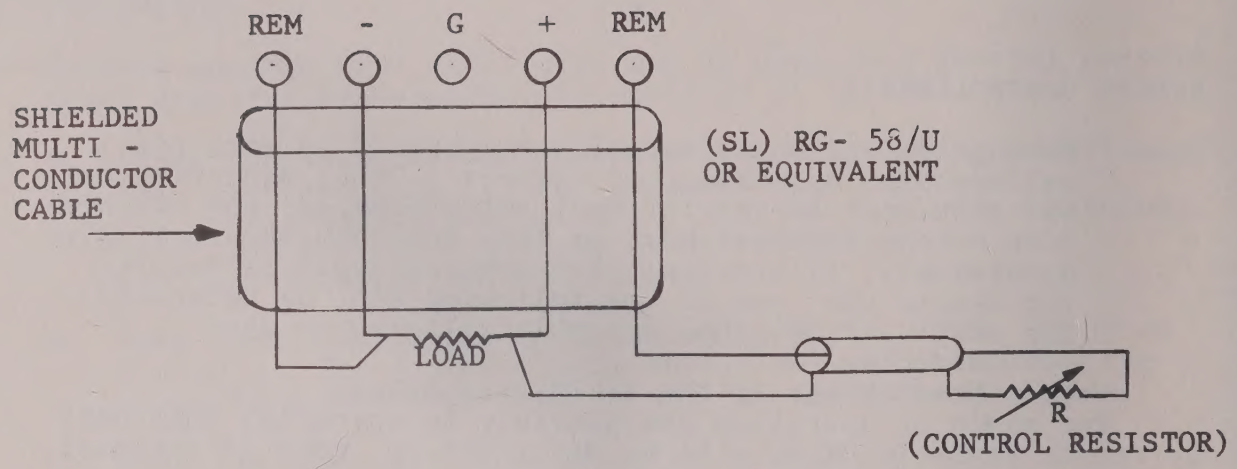


b. Set the high voltage and vernier controls to zero.
c. For each 500 ohms inserted at the end of the coax line, 1 volt will be developed by the power supply.

MODE 2:

This method of operation provides sensing at the load and eliminates the effect of lead drop.

a. Make connections as shown on following page.



b. Set the high voltage and vernier controls to zero.
c. As above, one volt will be developed for each 500 ohms inserted across the control lines.

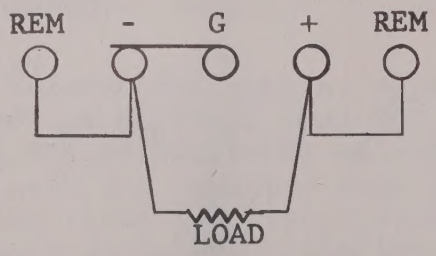
The control resistance R can be employed close to the load, in which case no shielded line will be required. It may also be located remotely from load and power supply, in which case a shielded line (SL) will be required connected as shown in the diagram.

5. REAR TERMINATIONS:

These units may be supplied with rear terminations in place of the front terminations and, in some instances, with both front and rear terminations. When rear terminations alone are supplied these may be treated in the same manner described above for front terminations.

Where both are supplied some difference in operation is involved for local use, if the rear terminations are employed. Under these conditions proceed as follows:

a. Throw the local remote switch to Remote:
b. Place two jumpers on the rear terminals as indicated in the diagram below.



For remote use either set of terminals may be employed in the normal manner. Control will then be derived from the particular set of terminals in use.

6. EXTERNAL REFERENCE

Reference glow tubes experience a progressive change of voltage with time. For example, a typical change is ½% for 1,000 hours of use. Where a highly precise reference voltage is available (negative with respect to the negative bus of the power supply) it may be employed in place of the internal reference by connecting to the terminals provided at the rear for this purpose.
To do this proceed as follows:

a. Remove the connections across Terminals 1 and 2.
b. Connect the external reference voltage to Terminals 2 and 3 with the positive side of the external reference connected to Terminal 3.

Any reference voltage of 85 volts or more may be used; however, for each volt over 87 volts, provided by the external reference, 500 ohms of resistance should be inserted in the line between the reference potential and the external reference terminal on the unit. For example, if a reference of -150 volts is available, a resistor of 31,000 ohms, ±1% should be provided. This resistor should be of a wire-wound type with high stability alloy, since it will directly influence the stability of the output voltage.

IV. MAINTENANCE

1. REPLACEMENTS

When replacements are required any part may be used of the values and tolerances indicated on the circuit diagram. However, replacement of some parts may require recalibration and/or resetting of the null adjustment.

2. SERIES TUBES

The following instructions apply for units having one or more series tubes. If, at any time, it is believed that one or more series tubes and associated circuits are faulty, this may be checked as follows:

a. Remove all series tubes but one.
b. Turn the equipment on and apply a load of 200 ma at some low voltage. Check ripple and regulation.
c. Remove this series tube and place another series tube in another socket and repeat b.
d. Repeat b for every other socket and tube, taking one (1) at a time.
e. If one or more of the circuits shows faulty, repeat the test in each case using a tube known to be good.
f. If a favorable result is obtained, it may be taken that the previous tube is faulty. If not, the associated circuits should be checked for faults.

3. NULL-BALANCE ADJUSTMENT

This unit employs a bridge configuration in the control system. When the system is balanced the principal remaining error is that due to the reference element (an 85A2 reference tube). To null the system, proceed as follows:

a. Connect a voltmeter having a full scale sensitivity of 3 volts or less between the negative high voltage terminal and the null test point on the front panel. Set the null control to obtain a reading of zero. A more sensitive indication may be obtained by alternately connecting and disconnecting the voltmeter.

4. CALIBRATION

If it is desired to calibrate this unit for external control resistance, proceed as follows:

a. Set up to measure the output voltage either with a precise voltmeter or by a comparison method against an external standard.
b. Perform the null-balance adjustment.
c. Obtain a resistance (R) of a value to provide a good on scale reading for the voltmeter, or equal, to the standard potential available.
d. Connect the unit for remote control under MODE 1 above using the available resistance as the control resistor R.
e. Set the calibration control to obtain the correct voltage.
   Note: The procedure for calibration of panel controls is self-evident.

MODELS 236A/236AK

PROGRAMMING CONSTANT:
500 ohms-per-volt
115V, 50-60 cps input

REFERENCE SYMBOL	DESCRIPTION	TYPE OR PART NO.	MANUFACTURER
B1	Motor, shaded pole, 115V, 50-60 CPS, 6 in. fan blade	DYAB-570-3	Barber-Colman
*C1,2,3	Capacitor, electrolytic, 120uf, 450 VDC, insul. sleeve	D32346	Sprague
*C4,7	Capacitor, electrolytic, 80uf, 450 VDC, insul. sleeve	D15911	Sprague
*C5,6	Capacitor, electrolytic, 320uf, 300 VDC, insul. sleeve	D31962	Sprague
C8	Capacitor, mica, 100uuf ±5%, 500 VDC	CM20B101J	Micamold
C9	Capacitor, mica, 220uuf ±5%, 500 VDC	CM20B221J	Micamold
*C10	Capacitor, electrolytic, 25uf, 25 VDC, insul. sleeve	KE-25/25	Frako
C11	Capacitor, mylar, 0.5uf ±20%, 1000 VDC	Type 2111	Chicago Cond.
*C12,13,14	Capacitor, electrolytic, 40uf, 450 VDC, insul. sleeve	D19939	Sprague
CORD	Line cord, 7' lg., #18 gauge, 3 cond., 3 prong plug	346-B-52	EMC
*CR1-CR4	Rectifier, silicon	CER71	Solitron
*CR5, CR8	Rectifier, selenium	8J1	Radio Receptor
*DS1,2	Lamp, 6.3V, 0.25A	44	G.E.
*DS3,4	Lamp, neon	NE-2	EMC
*DS5	Incandescent lamp, 230V, 10W	FS6	Sylvania
E1,2	Post, binding, red	29-3R	Grayhill
E3-9	Post, binding, black	29-3B	Grayhill
E10	Shorting link	938-L	General Radio
E11	Shorting link	141-J	Cinch-Jones
*F1	Fuse, cartridge, 5A	3AG5	Sightmaster
*F2	Fuse, cartridge, 3/8A	3AG3/8	Sightmaster
J1	Tip jack, nylon, black	105-603	E.F. Johnson
J3	Socket, octal	9977	Cinch-Jones
M1	Milliammeter, 0-200 MADC ±2% full scale	Model 653/MA200	EMC
M2	Voltmeter, 0-600 VDC ±2% full scale	Model 653/V600	EMC
R1,2,3,5,6,37, 38,39	Resistor, fixed, comp., 82K ±10%, 2W	HB-8231	Allen-Bradley
R4,26	Resistor, fixed, comp., 1 megohm ±10%, ½W	EB-1051	Allen-Bradley
R7	Resistor, fixed, WW, vitreous enamel, 2000 ±5%, 10W	10X2000	Ward Leonard
R8	Resistor, fixed, comp., 15K ±10%, 2W	HB-1531	Allen-Bradley
R9	Resistor, fixed, comp., 22K ±10%, 1W	GB-2231	Allen-Bradley
R10	Resistor, fixed, WW, vitreous enamel, 7000 ±5%, 5W	5X7000	Ward Leonard
R11	Resistor, fixed, comp., 8200 ±10%, 2W	HB-8221	Allen-Bradley
R12	Resistor, fixed, comp., 330K ±10%, ½W	EB-3341	Allen-Bradley
R13	Resistor, fixed, comp., 390K ±10%, ½W	EB-3941	Allen-Bradley
R14	Resistor, fixed, WW, vitreous enamel, 25K ±5%, 25W	25F25000	Ward Leonard
R15	Resistor, fixed, comp., 5100 ±5%, 1W	GB-5125	Allen-Bradley
R16	Resistor, fixed, comp., 4.7 megohms ±10%, ½W	EB-4751	Allen-Bradley
R17,18	Resistor, fixed, comp., 150K ±10%, 2W	HB-1541	Allen-Bradley
R19-24	Resistor, fixed, comp., 33K ±10%, 2W	HB-3331	Allen-Bradley
R25	Resistor, fixed, comp., 100K ±10%, ½W	EB-1041	Allen-Bradley
R27	Resistor, fixed, comp., 220K ±10%, ½W	EB-2241	Allen-Bradley
R28	Resistor, fixed, comp., 200K ±10%, 1W	GB-2041	Allen-Bradley
*R29	Resistor, variable, WW, 3000 ±5%, 2W, linear taper, ¼ in. dia. by 1/8 in. lg. slotted shaft. Series 43	CM18923	Clarostat
R30	Resistor, fixed, comp., 220K ±10%, 1W	GB-2241	Allen-Bradley
*R31	Resistor, variable, WW, 5000 ±5%, 2W, linear taper, ¼ in. dia. by 1/8 in. lg. slotted shaft. Series 43	CM26723	Clarostat
*R32	Resistor, fixed, WW, 37K ±1%, 3W	Type P3-W	Prec. Resistor
*R33	Resistor, fixed, WW, 3000 ±1%, ½W	Type TX-178	Prec. Resistor
*R34	Resistor, variable, WW, 300K ±2%, 8W, linear taper, 3/8 in. dia. insul. shaft	976-S11	General Radio
*R35	Resistor, variable, WW, 10K ±5%, 2W, linear taper, ¼in. dia. by ½ in. lg. shaft. Series 43	CM21189	Clarostat
*R36	Resistor, variable, WW, 50K ±5%, 3W, linear taper, ¼ in. dia. by ½ in. lg. shaft. Series 58	CM20403	Clarostat
R40	Resistor, fixed, comp., 4.7 ±5%, 1W	GB-47G5	Allen-Bradley
R41,44,47,50,53	Resistor, fixed, comp., 82 ±10%, 1W	GB-8201	Allen-Bradley
R42,45,48,51,54	Resistor, fixed, comp., 470 ±10%, 1W	GB-4711	Allen-Bradley
R43,46,49,52,55	Resistor, fixed, comp., 47 ±10%, 1W	GB-4701	Allen-Bradley
*RT1	Ballast tube	AMP 3-4	Amperite
*S1	Switch, toggle, SPST	160-73	Carling
*S2,3	Switch, toggle, TPDT	HL233-73	Carling
T1	Transformer, power	5022	EMC
T2	Transformer, filament and power	5023	EMC
TB1	Barrier strip, 3 terminal	3-141-Y	Cinch-Jones
TB2	Barrier strip, 9 terminal (rear termination only)	9-141-Y	Cinch-Jones
*V1,2	Electron tube	5R4GY	RCA
*V3,5,7	Electron tube	OA2	RCA
*V4,6	Electron tube	OB2	RCA
*V8	Electron tube	85A2/OG3	Amperex
*V9	Electron tube	12AX7	RCA
*V10	Electron tube	6AU6	RCA
*V11,12	Electron tube	EM10	EMC
*V13	Electron tube (236A)	12AX7	RCA
*V13	Electron tube (236AK)	12AY7	G.E.

REFERENCE SYMBOL	DESCRIPTION	TYPE OR PART NO.	MANUFACTURER
*V14-V18	Electron tube	6550 or KT88	Tung-Sol British Ind.
XDS1	Holder assembly, pilot lamp, green faceted lens	100	Drake
XDS2	Holder assemble, pilot lamp, red faceted lens	100	Drake
XF1,2	Extractor post, fuse, miniature	342003	Littelfuse
XV1,2,14-18	Socket, octal	9751-9	Eby
XV3-8,XV10	Socket, 7 pin, miniature	53P24022	Cinch-Jones
XV9,13	Socket, 9 pin, noval	14502	Cinch-Jones

ELECTRICAL PARTS LIST
CHOPPER STABILIZER UNIT
336-A-32/349-A-17

C1	Capacitor, mica, 27uuf ±5%, 500 VDC	CM19B270J	ARCO
C2,3,4	Capacitor, mylar, 0.022uf ±10%, 200 VDC	107-0.022/200	Pyramid
*C5	Capacitor, tantalum, etched foil, non polarized, 20uf ±20%, 25 VDC	TAE20-25SDLK-NP	Int'l Elects.
*K1	Chopper, SPDT, 6.3V, 60 CPS	Model 175	AIRPAX
P3	Plug, octal	86-CP8	Amphenol
R1	Resistor, fixed, comp., 120K ±10%, ½W	EB-1241	Allen-Bradley
R2	Resistor, fixed, comp., 33K ±10%, ½W	EB-3331	Allen-Bradley
R3,6	Resistor, fixed, comp., 4.7 megohms ±10%, ½W	EB-4751	Allen-Bradley
R4	Resistor, fixed, comp., 100K ±10%, ½W	EB-1041	Allen-Bradley
R5,7	Resistor, fixed, comp., 680K ±10%, ½W	EB-6841	Allen-Bradley
R8	Resistor, fixed, comp., 56K ±10%, ½W	EB-5631	Allen-Bradley
R9	Resistor, fixed, comp., 270K ±10%, ½W	EB-2741	Allen-Bradley
R10	Resistor, fixed, comp., 1 megohm ±10%, ½W	EB-1051	Allen-Bradley
*V1	Electron tube	12AX7	RCA

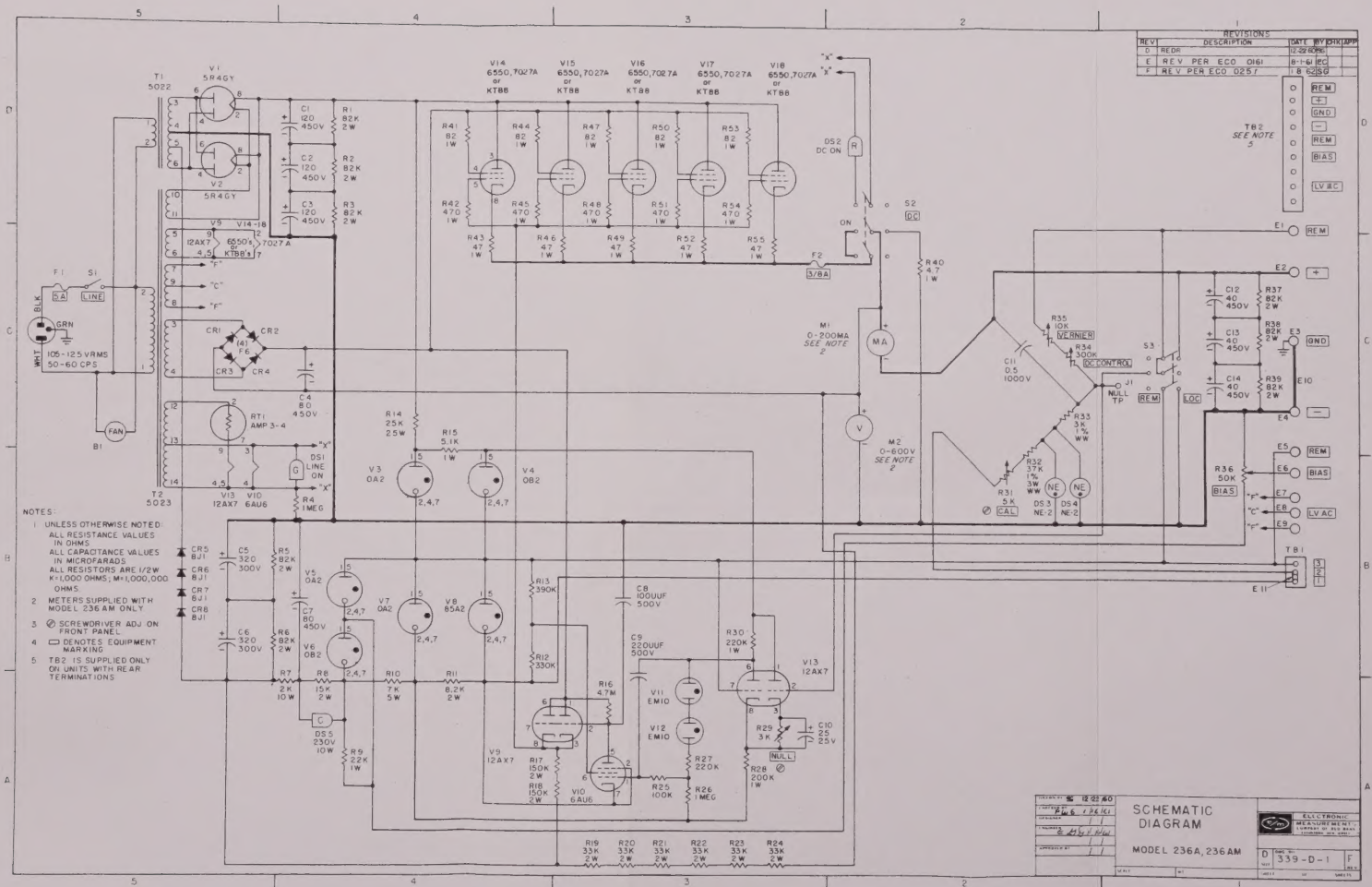
PARTS LIST ADDENDUM

220 volt input
198-240 volts, 60 CPS input range

B1	Motor, shaded pole, constant speed, 220V, 60 CPS, 6" fan blade	1075-3174	Howard Industries
*F1	Fuse, cartridge, 3A	3AG3	Sightmaster
*S1	Same as for 115V version		
T1	Transformer, power	5126	EMC
T2	Transformer, filament and power	5163	EMC

NOTES:

1. *ASTERISKED PARTS are recommended spares in quantity one per reference symbol, except fuses, which are three per reference symbol.
2. WHEN MAKING REPLACEMENTS: Part numbers are indicative of stock employed at the time of compilation of this list. Unless otherwise noted, and except for Electronic Measurements (E/M) numbers, "or equal" parts may be used for replacement. Electronic Measurements reserves the right to replace a part with an "or equal" part.
3. WHEN ORDERING PARTS FROM E/M: Include model and serial numbers of the instrument. Note carefully and include the letter suffix of any transformer number. In case of a discrepancy between a parts list number and the number actually printed on the part, employ the latter.
4. RECOMMENDED SPARES. When electrolytic capacitors are to be stored as spares for a year or more, request Technical Note 32.


REVISIONS
REV | DESCRIPTION | DATE | BY | CHK | APP
D | REDR | 12-22-60 | PMS
E | REV PER ECO 0161 | 8-1-61 | EC
F | REV PER ECO 0257 | 1-8-62 | SG
SCHEMATIC DIAGRAM
MODEL 236A, 236AM
ELECTRONIC MEASUREMENTS
339-D-1
NOTES:
1 UNLESS OTHERWISE NOTED: ALL RESISTANCE VALUES IN OHMS. ALL CAPACITANCE VALUES IN MICROFARADS. ALL RESISTORS ARE 1/2W K=1,000 OHMS; M=1,000,000 OHMS.
2 METERS SUPPLIED WITH MODEL 236 AM ONLY
3 SCREWDRIVER ADJ ON FRONT PANEL
4 DENOTES EQUIPMENT MARKING
5 TB2 IS SUPPLIED ONLY ON UNITS WITH REAR TERMINATIONS
T1 5022
T2 5023
V1 5R4GY
V2 5R4GY
V3 0A2
V4 0B2
V5 0A2
V6 0B2
V7 0A2
V8 85A2
V9 12AX7
V10 6AU6
V11 EM10
V12 EM10
V13 12AX7
V14 6550,7027A or KT88
V15 6550,7027A or KT88
V16 6550,7027A or KT88
V17 6550,7027A or KT88
V18 6550,7027A or KT88
M1 0-200MA SEE NOTE 2
M2 0-600V SEE NOTE 2
DS1 LINE ON
DS2 DC ON
DS3 NE-2
DS4 NE-2
DS5 230V 10W
S1 LINE
S2 DC
S3
J1 NULL TP
F1 5A
F2 3/8A
RT1 AMP 3-4
FAN
B1
CR1 CR2 CR3 CR4 F6
CR5 8J1
CR6 8J1
CR7 8J1
CR8 8J1
R35 10K VERNIER
R34 300K DC CONTROL
R31 5K CAL
R32 37K 1% 3W WW
R33 3K 1% WW
R36 50K BIAS
R29 3K NULL
R28 200K 1W NULL
TB1
TB2 SEE NOTE 5
E1 REM
E2 +
E3 GND
E4 -
E5 REM
E6 BIAS
E7 "F"
E8 "C"
E9 "F"
E10
E11
WHT BLK
GRN
105-125 VRMS 50-60 CPS
REM
+
GND
-
REM
BIAS
LV &C
LOC
LV AC

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